

Summary of Major Issues

The formal public review and comment period is currently underway and is not scheduled to close until the conclusion of the Public Hearing on December 10, 2003. Upon the close of the Public Hearing and public comment period, staff will prepare written responses to all public comments received. In addition, staff will also revise the TMDL Basin Plan amendment and supporting documents as appropriate to reflect public comment and direction received from the Regional Board members.

This TMDL Basin Plan amendment has been under development for approximately four years. Throughout the public participation process to date, numerous issues related to the TMDL Basin Plan amendment and Implementation Plan have been raised. The purpose of this document is to summarize four of the most significant issues and provide preliminary responses.

Two Public Processes

Each of the major issues below are categorized as pertaining to the TMDL Basin Plan amendment or as pertaining to the Implementation Plan. This distinction is important because two separate public processes are required as described below. No earlier than February 2004, the Regional Board will consider adoption of the tentative TMDL Basin Plan amendment which includes the TMDL, waste load allocations and reductions, and the Implementation Plan. However, the specific actions proposed in the tentative Implementation Plan (such as the issuance of an NPDES permit to the Port of San Diego and SIYB marina owners/operators), will be subject to a separate full public process including public review and comment, Public Workshops, Public Hearing, and Regional Board deliberation. This second Public Hearing and deliberation, in which the Regional Board will specify exactly how it will mandate compliance with the waste load reductions required in the TMDL, will be held in the future following the Regional Board's adoption of the tentative TMDL Basin Plan amendment and subsequent approval of the amendment by the State Board, Office of Administrative Law, and the USEPA.

I. Major Issues Pertaining to the TMDL Basin Plan Amendment

1. Water Quality Objective is Incorrect; Site-Specific Objective Needed

Issue

At the Regional Board's public workshop on November 20, 2003, stakeholders suggested that a site-specific objective should be developed for SIYB in lieu of adoption of the TMDL.

Preliminary Response

Currently, there are no site-specific objectives (SSOs) for dissolved copper at SIYB. In the absence of SSOs, the numeric water quality criteria for dissolved copper as set forth in the California Toxics Rule (CTR) are the legally applicable water quality objectives for SIYB.

In March 2000, the State Water Resources Control Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (SIP). The SIP establishes implementation provisions for priority pollutant criteria promulgated by USEPA, including the CTR, and authorizes the Regional Board to develop SSOs whenever the Regional Board determines, in the exercise of its professional judgement, that is appropriate to do so. The SIP requires the Regional Board to consider initiating development of a SSO under the following three conditions:

- 1) A written request for a site-specific study, accompanied by a preliminary commitment to fund the study, subject to development of a workplan, is filed with the Regional Board; and,
- 2) Either: a) a priority pollutant criterion or objective is not achieved in the receiving water; or
b) a holder of an NPDES permit demonstrates that they do not or may not in the future meet an effluent limitation based on the criterion or objective; and
- 3) A demonstration that the discharger cannot be assured of achieving the criterion or objective and/or effluent limitation through reasonable treatment, source control, or pollution prevention measures.

During the four years that the SIYB TMDL has been under development, staff from the Regional Board met with the public on numerous occasions including workshops, conferences, and various stakeholder meetings. During most of these occasions, there was virtually no discussion indicating interest in development of SSOs. Only recently has there been some limited discussion and interest shown by stakeholders regarding development of SSOs. However, there have been no commitments to participate in, or fund a site-specific study, nor have any written requests been received to begin the process. Therefore, none of the conditions required in the SIP have been met.

More importantly, the Regional Board did not receive any requests to develop copper SSOs for SIYB as a part of its ongoing 2003 Triennial Review process. The Triennial Review of the Basin Plan is a public process in which the Regional Board solicits potential basin planning issues or project ideas from the public. The issues submitted by the public, as well as issues recommended by Regional Board staff, are then reviewed and prioritized. The Triennial Review process results in the approval of a prioritized list of issues which serves as the “workplan” for all Regional Board Basin Planning activities during the following three years. Earlier this year, the Regional Board solicited and received approximately 100 potential issues that are now under consideration as part of the ongoing Triennial Review. However as mentioned above, none of the issues involved the development of a copper SSO for SIYB.

Studies by interested parties supporting the development and adoption of SSOs may occur concurrently with actions by dischargers to meet compliance with this TMDL. If and when site-specific copper water quality objectives are adopted for SIYB, the TMDL will be modified accordingly. However, it is highly likely that even if copper SSOs are developed for SIYB, significant reductions in copper loading will still be required in order to meet the new SSOs and protect beneficial uses.

Evidence that copper loading reductions will likely still be required for SIYB comes from the following two examples. There is currently one set of SSOs that have been adopted in California for copper. The San Francisco Regional Board adopted SSOs for dissolved copper in the Lower South San Francisco Bay using the Water Effects Ratio (WER) procedure. The WER procedure is the most commonly used method to develop SSOs. These SSOs for copper are 6.9 µg/L for a 4-day average and 10.8 µg/L for a one-hour average, as compared to CTR criterion/water quality objectives of 3.1 µg/L and 4.8 µg/L, respectively. The highest concentrations of dissolved copper levels measured in SIYB range from 8 µg/L to 12 µg/L.

Within the last two weeks, the Regional Board has learned that the US Navy has conducted preliminary copper WER studies for north and south San Diego Bay (although the calculations specifically exclude SIYB).¹ Applying the US Navy’s preliminary WER values would result in modified copper objectives of 4.4 µg/L for the 4-day average and 6.9 µg/L for the 1-hour average for the north Bay, where SIYB is located. It must be emphasized that the studies conducted by the US Navy are preliminary, have not undergone peer review, and according to the US Navy, may change slightly. In addition, in order to be officially considered, the SSOs must be developed in accordance with specific protocol published by United States Environmental Protection Agency (USEPA) and/or the State Board. It is unclear to what extent that protocol was followed for these preliminary calculations. Furthermore, the studies did not take into account data specifically from SIYB, and it is not clear how SSOs developed based on WER studies

¹ The US Navy presented results from their preliminary WER studies on San Diego Bay at the Advanced Technology Research Project Corporation (ATRP) International Symposium, *Prevention of Pollution from Ships, Shipyards, Drydocks, Ports and Harbors*, New Orleans, November 5-7, 2003.

conducted in the north or south portions of San Diego Bay would compare to SSOs for SIYB.

In summary, even if copper SSOs are officially developed and eventually adopted for SIYB, the development should not be done in lieu of, or in advance of, adoption of the proposed TMDL Basin Plan amendment. Rather the Regional Board should adopt the TMDL Basin Plan amendment first to ensure that the gradual copper load reductions required by the TMDL are initiated. The proposed 17-year compliance schedule can readily accommodate the conduct of SSO studies which could occur concurrently with the waste load reductions. Furthermore, no wasted effort will be incurred by the dischargers since it is almost certain that a TMDL will still be required even if SSOs are eventually adopted. The only anticipated impact of the SSOs is that the magnitude of the required waste load reductions may be reduced.

2. No Demonstrated Impacts on SIYB Beneficial Uses

Issue

There is a lack of data demonstrating impairment of beneficial uses in Shelter Island Yacht Basin.

Preliminary Response

It is not necessary for the Regional Board to demonstrate that beneficial uses in SIYB are impaired due to copper. This is because the legal obligation for the Regional Board to adopt a copper TMDL Basin Plan amendment results from the designation of SIYB as an impaired waterbody pursuant to section 303(d) of the Clean Water Act. The section 303(d) listing is based on a substantial body of data clearly demonstrating that the applicable water quality objectives for copper, toxicity, and pesticides are being violated in SIYB waters. The TMDL development process further confirmed this fact.

Although not critical to the requirement for a TMDL, evidence of beneficial use impairment in SIYB nevertheless exists. In addition to a large body of scientific literature documenting the general toxicity of copper to aquatic life in the marine environment, there are also a number of scientific studies specific to SIYB as summarized below.

General Toxicity of Copper

First and foremost, it should be emphasized that copper is the biocide of choice in most antifouling paints because of its well documented toxicity to aquatic life. Copper antifouling paints are registered pesticides applied to vessel hulls for the explicit purpose of killing or harming marine fouling organisms. The paints are designed to poison the entire aquatic environment of a vessel hull surface in order to discourage the attachment of marine organisms.

Copper is a naturally occurring element in the marine aquatic environment, and is a minor nutrient for plants and animals at very low concentrations. However, at concentrations not much higher, it is toxic to a wide range of aquatic organisms, not just fouling organisms. Toxicity to aquatic life varies between species and within individual species life stages. The early life stages of fish, bivalves (e.g., mussels and oysters), and echinoderms (e.g., sand dollars) are especially vulnerable to copper pollution. Phytoplankton and zooplankton (which are essential components in the marine food chain and ecosystem) are the most sensitive organisms to copper pollution.

The general toxicity of copper is well established in the scientific literature. For example, a literature search specific to copper and marine bivalves, reveals more than 40 studies linking copper tissue residues in marine bivalves to adverse affects including species survival, growth, reproduction, and biochemical and physiological changes.

Copper Toxicity in SIYB

Water quality monitoring of copper concentrations at SIYB has consistently documented levels in violation of the water quality objectives over the past 20 years (Regional Board, 2000; McPherson and Peters, 1995; Valkirs *et al.*, 1994; Johnston, 1990; Krett, 1980). Specifically, dissolved copper concentrations at SIYB are two to three times the numeric water quality objectives for dissolved copper, as set forth by USEPA in the California Toxics Rule (CTR). The CTR water quality criteria are derived from toxicity studies and are specifically designed to protect aquatic life from acute and chronic toxicity. The technical report accompanying this proposed TMDL Basin Plan amendment (Supporting Document 3) contains a discussion describing the copper pollution observed in SIYB.

At the range of copper concentrations found in SIYB, the literature documents the adverse impacts of copper on aquatic organisms, particularly for bivalves. In addition there have been a number of local scientific studies specifically conducted in SIYB. These studies document elevated copper concentrations in sediment and mussel tissue, SIYB water column and sediment toxicity, and adverse affects on biota as summarized below.

Krett, 1980: Investigators found that phytoplankton genera considered sensitive to copper were absent at SIYB, while copper tolerant genera were present.

Johnston, 1990: This study documented a decrease in species diversity at SIYB that paralleled an increase in copper levels moving from the Yacht Basin's entrance towards the inner portion of the Basin.

VanderWeele, 1996: In this study, mussels were transplanted from a less contaminated site in San Diego to three locations in SIYB. Researchers found that the mussels rapidly accumulated copper in tissues to a degree that was proportional to concentration levels in the water column. Measured concentrations of copper in the mussel tissue increased towards the inner portion of the Basin and were much

greater (10 to 40 times greater) than those found in the main channel of San Diego Bay.

SWRCB et al., 1996: Results from the Bay Protection and Toxic Cleanup Program documented elevated copper concentrations in the sediment at SIYB. In addition, SIYB sediments were found to be toxic to sea urchins and amphipods.

Regional Board, 2000: Developmental toxicity testing was performed on the mussel, *Mytilus edulis*, using one water column sample taken from the inner portion of SIYB where copper concentrations were found to be elevated (station A) and one sample from the Bay near the entrance of SIYB where concentrations fell below the numeric water quality objective (station G). Toxicity was observed in the laboratory on samples taken from the high concentration station A, but toxicity was not seen on the low concentration station G. While the results of this test showed that toxicity did occur at the high concentration station, the test does not identify the cause of the toxicity.

Salazar, 2002: Water column concentrations and mussel tissue concentrations were measured in 5 different locations in San Diego Bay. Results showed that the concentrations observed in the SIYB samples far exceeded the concentrations in any of the other stations, which were located at NOSC Pier, EOD Pier on North Island, Coronado Cays Marina, and the Magnetic Silencing Facility (control station).

II. Major Issues Pertaining to the Implementation Plan

3. Statewide Ban on Copper Paints is Needed

Issue

Stakeholders have stated that the problem of elevated copper levels in marinas is a statewide problem and therefore it is not fair to single out SIYB with this TMDL. Instead, the solution to the problem at SIYB is a statewide or national ban on copper-based antifouling paints, rather than the regulation of the Port of San Diego and SIYB marina owners/operators as specified in this TMDL.

Preliminary Response

The TMDL process is, by definition, discriminatory. Because TMDLs are designed to restore a specific waterbody(ies), impaired by a specific pollutant(s) as designated on the Clean Water Act section 303(d) list, the TMDL process is not intended to apply equally to all water bodies. Calculated pollutant load allocations and reductions are required only for those specific waterbodies addressed by a specific TMDL. Waterbodies that are not

designated as impaired, are not subject to a TMDL and hence are not subject to mandatory pollutant load reductions.

The Regional Board listed SIYB on the Clean Water Act section 303(d) list of impaired waterbodies in 1996 due to extensive data that documented consistent violations of the dissolved copper water quality objectives. The Regional Board is under a legal obligation to adopt a TMDL for all water bodies identified on the Section 303(d) list. Accordingly, a TMDL was developed for SIYB to resolve the copper impairment and protect beneficial uses.

In the San Diego Region, SIYB is currently the only marina, bay, or harbor listed on the Section 303(d) list for elevated levels of dissolved copper in the water column. While it is likely that impairment may exist in other marina areas with a high density of recreational vessels, low tidal flushing, and other site-specific factors, there is insufficient data to support additional Section 303(d) listings at this time. If and when sufficient data becomes available, other marinas may be added to the Section 303(d) list and TMDLs will subsequently be developed for these waterbodies. This data should become available in the future under the Regional Harbor Water Quality Monitoring Program that will be conducted by Harbor Authorities in the San Diego Region pursuant to a California Water Code section 13225 directive dated July 24, 2003.

The Regional Board recognizes that the copper pollution problem in SIYB is likely part of a bigger problem that may exist in other recreational harbors and bays across the state. For this reason the Regional Board will continue to pursue additional regulatory, and possibly legislative, solutions with other government agencies having legal authority over the registration, sale, and use of copper antifouling paints in California. The Regional Board has been coordinating for several years on the SIYB TMDL with the California Department of Pesticide Regulation (DPR), the San Diego County Agricultural Commissioner (CAC), and the USEPA. The State Board has a formal Management Agency Agreement (MAA) with DPR dated March 1997 that commits both agencies to work together to jointly address violations of water quality standards due to pesticides. In support of the MAA, DPR has also developed the *Process for Responding to Pesticides in Surface Waters (Process)* dated March 2003 that describes specific actions that both agencies may undertake to address water quality problems resulting from the use of pesticides. For example, the *Process* recognizes that DPR can designate a pesticide as a restricted material or cancel a pesticide's registration in California. The *Process* also recognizes that the Regional Board can designate a waterbody on the Clean Water Act Section 303(d) list as impaired due to pesticides, and subsequently develop an TMDL to resolve the impairment.

On September 16, 2003, DPR convened a Copper Summit interagency meeting in Sacramento to assess the geographic scope of the copper antifouling paint problem in California. A secondary objective of the meeting was to assess the availability and need for supporting data. The interagency meeting was coordinated under the MAA between State Board and DPR, and included participation by DPR, CAC, USEPA, the State

Board, and Regional Boards. As a result of the meeting, it was informally concluded that while copper is recognized as a problem in many areas of high boating activity, more data is needed to characterize the extent of the problem in California.

In the event that regulations or restrictions on copper antifouling paints are eventually imposed on a countywide, statewide, or national level, it is likely that the required copper waste load reductions will be achieved in SIYB sooner than the 17 year schedule proposed in the TMDL Implementation Plan.

4. Economic Impacts will be Severe

Issue

The economic impacts of the proposed TMDL will be detrimental to the SIYB marinas and boating community. One reasonably foreseeable method of compliance with the waste load reductions required by the TMDL involves the gradual phasing out of the use of copper-based antifouling paints and the increased use of nontoxic and less toxic alternative coatings. In this event, there will be increased costs to the boating community. For example, the initial application of nontoxic and less toxic bottom coatings is more costly than the application of copper-based paints. In addition nontoxic and less toxic coatings require more frequent hull cleaning and result in increased maintenance costs to the individual boat owner.

Furthermore, since boaters will be subject to regulations that are in effect exclusively in SIYB, they might find it preferable to moor their boats in other locations. A potential decrease in business and potential increase in management expenses associated with the implementation of the TMDL (e.g., oversight and enforcement) will place SIYB marinas at an economic disadvantage.

Preliminary Response

Although the Regional Board acknowledges that increased costs will be associated with the implementation of the TMDL, a number of the provisions in the proposed Implementation Plan were based on the findings of an important economic report, which is briefly described below. The findings of this report were utilized for the specific purpose of minimizing, to the extent possible, the overall TMDL implementation costs to the boating community.

An investigation mandated under California Water Code section 13366 was recently completed for the purpose of identifying incentives necessary to ensure that nontoxic alternatives to metal-based antifouling hull coatings are used on recreational vessels in San Diego Bay. The investigation and resulting report, "Transitioning to Non-Metal Antifouling Paints On Marine Recreational Boats in San Diego Bay" identified nontoxic alternatives, compared the costs of using these alternatives to the cost of using traditional copper-based antifouling paint, and identified economic incentives for transitioning to the

use of alternatives. This report, which is known as the Carson *et. al* report, considered economic impacts and incentives from a San Diego Bay-wide perspective.

The Carson *et. al* report found that a conversion from copper to nontoxic coatings would not result in substantial economic hardship to the boating community. This finding is premised on two assumptions: 1) all newly manufactured boats would be painted with nontoxic coatings; and 2) boats in need of routine stripping would be re-painted with nontoxic coatings. This is significant because stripping is one of the most expensive maintenance costs.

Research shows that when considered over the life of the boat, boat owners are not likely to face a significant price increase for maintaining the boat hulls. This is because although nontoxic epoxy coatings are initially more expensive to apply, they are actually more cost effective over the long-term life of a boat. Initial costs are greater, however boat owners will likely realize small cost savings on nontoxic hull coatings and maintenance over the life of the boat compared to the costs associated with copper-based paints.

On a San Diego Bay-wide level, if a phase-in of nontoxic coatings occurred over a 15-year time span, it would cost the boating community approximately \$1 million above and beyond usual maintenance costs associated with copper-based paints. This extended time span takes into account the average routine stripping schedule for old bottom paint. The \$1 million figure is an estimate of the total cost to convert all of the boats in San Diego Bay (approximately 7000 boats) from copper paints to nontoxic coatings. A range of nontoxic and less toxic alternative coatings is currently available and there is a growing interest in further product development. As product research and development continues, better product technology, availability, and lower prices will likely result.

In summary, the Carson *et. al* report established that converting to nontoxic strategies is possible and economically feasible if sufficient time is provided. The proposed TMDL compliance schedule incorporates the Carson *et. al* report's recommended 15-year conversion period and provides an additional two-year grace period during which additional education efforts, commercial demonstrations, and scientific studies will be initiated. The latter was also a recommendation of the Carson *et. al* report in order to facilitate the conversion to nontoxic coatings.

As noted in the proposed Implementation Plan, the Port of San Diego is named as a Responsible Party for TMDL implementation. Any economic disadvantage that might be realized by marinas in SIYB could potentially be offset by discretionary actions by the Port of San Diego. The Port, for example, could choose to "level the economic playing field" in San Diego Bay by imposing the same controls on marinas bay-wide as will be imposed on marinas in SIYB.

In the big picture, overall costs to the boating community will decrease with the continued growth of the market for alternative coating products. The mandate for

achieving the copper waste load reductions specified in the SIYB TMDL serves as a small, but nonetheless important, impetus for this overall process.

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